

### **ABSTRACT OF THE DISCLOSURE**

A reflectometry apparatus and method is presented that allow the diffuse and specular reflectance parameters of an object to be independently and reliably measured, and that allow the variations in surface normal and surface height to be estimated. An extended light source having an elongated configuration, for example a linear cylindrical light source such as a neon tube, is moved across the surface of an object while a digital camera detects the reflected light to acquire a series of images of the object surface. A reflectance trace table is synthesized for a range of model parameters using a virtualized rendition of the linear light source. For each pixel, the observed reflectances are compared to the synthesized reflectance trace table, to determine the reflectance parameters that most closely match the observed data.